WHAT IS CLAIMED IS:

1. A diffraction optical element wherein at least two diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, at least two of said diffraction gratings are formed on a curved surface and adjacent to each other, and these two adjacent diffraction gratings are equal to each other in the shape of a curved tip plane in which the tips of respective grating portions are ranged.

2. A diffraction optical element wherein at least two diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, at least two of said diffraction gratings are formed on a curved surface and adjacent to each other, and the shapes of a curved tip plane in which the tips of the grating portion of one of these two adjacent diffraction gratings are ranged and a curved bottom plane in which the groove bottoms of the grating portion of the other diffraction grating are ranged are equal to each other.

3. A diffraction optical element wherein at least two diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, at least two of said diffraction gratings are formed on a curved surface and adjacent to each other, and these

two adjacent diffraction gratings are such that a line linking the tips of the opposed grating portions thereof is substantially parallel to an optical axis.

4. A diffraction optical element wherein a plurality of diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, and two adjacent ones of said plurality of diffraction gratings satisfy

$$\alpha \leq \beta,$$

where β represents the angle formed between the grating edge of the grating portion thereof and the grating surface of the grating portion, and α represents the angle formed by the grating surface with respect to the surface normal of a curved tip plane at a position whereat the curved tip plane in which the tips of said grating portion are ranged and said tips intersect with each other.

5. A diffraction optical element wherein a plurality of diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, and the grating thickness of the grating portions of said diffraction gratings is such that the length thereof in a direction parallel to the surface normal of a curved tip plane in which the tips of said grating portions are ranged at a position whereat the

curved tip plane and said tips intersect with each other is constant.

6. A diffraction optical element wherein at least two diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, at least two of said diffraction gratings are formed on a curved surface and adjacent to each other, and these two adjacent diffraction gratings are coincident with each other in the center of curvature of a curved tip plane in which the tips of the gratings of the respective grating portions thereof are ranged.

7. A diffraction optical element wherein at least two diffraction gratings formed of at least two kinds of materials differing in dispersion are laminated, at least two of said diffraction gratings are formed on a curved surface and adjacent to each other, and the grating spacing between these two adjacent diffraction gratings is equal over the range of use.

8. A diffraction optical element according to any one of Claims 1 to 7, wherein substrates on which said diffraction gratings are formed are joined together in the non-grating area of each of said diffraction gratings.

9. A diffraction optical element according to any one of Claims 1 to 7, wherein at least one of said laminated diffraction gratings has at least one diffraction grating differing from it in the direction of the grating shape of the grating portion.

10. A diffraction optical element according to any one of Claims 1 to 7, wherein the wavelength area used is a visible range.

11. A diffraction optical element according to any one of Claims 1 to 7, wherein at least one of said plurality of diffraction gratings is such that the material forming said diffraction gratings is the same as the material forming a substrate on which said diffraction gratings are provided.

12. A diffraction optical element according to Claim 11, wherein said substrate has lens action.

13. A diffraction optical element according to any one of Claims 1 to 7, which is formed on the cemented surface of a cemented lens.

14. A diffraction optical element according to any one of Claims 1 to 7, wherein said plurality of diffraction gratings are laminated so that the

diffraction efficiency of a particular order may heighten in the entire wavelength area used.

15. An optical system using a diffraction optical element according to any one of Claims 1 to 7.

16. An optical system according to Claim 15, which is an imaging optical system.

17. An optical system according to Claim 15, which is an observation optical system.

Add B2